Claims

1. Device for the production of tuneable picosecond light pulses in the visible spectral range, having a laser system (LS) that emits femtosecond light pulses in the infrared spectral range, and having an optical frequency converter (FC) for converting the wavelengths of the light pulses into the visible spectral range, characterized in that the wavelength of the light pulses emitted by the laser system (LS) can be tuned, and that an optical stretcher (OS) is provided, by means of which the pulse duration of the frequency-converted light pulses can be increased to at least 1 ps.

2. Device according to claim 1, characterized in that the frequency converter (FC) comprises one or more frequency doubler(s).

3. Device according to claim 1, characterized by at least one optical frequency filter that is switched either ahead of or after the frequency converter (FC).

4. Device according to claim 1, characterized in that the wavelength of the light pulses emitted by the laser system (LS)

can be tuned at least in the range between 1 µm and 2 µm, preferably between 800 nm and 2 µm.

5. Device according to claim 1, characterized in that the optical stretcher (OS) is formed by at least one dispersive optical element that is switched after the frequency converter (FC).

6. Device according to claim 1, characterized in that the laser system has a non-linear optical fiber (3) for the production of the tuneable light pulses, by means of which the optical spectrum of femtosecond light pulses can be modified using solitonic effects, whereby an optical compressor (2) is switched after the non-linear optical fiber (3).

7. Device according to claim 6, characterized in that the light pulses that are coupled into the non-linear optical fiber (3) have a pulse energy of at least one nanojoule.

8. Device according to claim 6, characterized in that the optical compressor (2) is configured to be adjustable, in such a manner that the time/frequency progression of the light pulses coupled into the non-linear optical fiber (3) can be modified.

9. Device according to claim 6, characterized in that the non-linear optical fiber (3) maintains polarity and/or shifts dispersion.

10. Device according to claim 6, characterized in that the non-linear optical fiber (3) has a core diameter of less than five micrometers.

11. Device according to claim 6, characterized in that the non-linear optical fiber (3) is configured as a microstructured photonic fiber.

12. Device according to claim 6, characterized in that the length of the non-linear optical fiber (3) is less than one meter.

13. Device according to claim 6, characterized by an additional optical compressor (6) that is switched after the non-linear optical fiber (3).

14. Use of a device according to one of claims 1 to 13 for microscopy, con-focal microscopy, fluorescence spectroscopy, or the automated search for active substances.